Claims:

1.(Withdrawn). A nuclear fusion reactor, comprising: a) a reactor chamber for holding a working liquid molecules, said working liquid molecules including at least two nuclei of heavy isotopes of hydrogen; b) structure for placing at least a portion of said liquid into a tension state, said tension state being below a cavitation threshold of said liquid, said tension state imparting stored energy into said liquid portion; c) a nuclear cavitation initiation source for nucleation of at least one bubble from said tension liquid, said bubble having as an nucleated bubble radius being greater than a critical bubble radius of said liquid; d) a pressure field source of growing said as nucleated bubble to form at least one expanded bubble; and e) a pressure field for imploding said expanded bubble, wherein following implosion of said expanded bubble a resulting temperature sufficient to induce at least one nuclear fusion reaction is provided to said liquid.

2(Withdrawn) The reactor of claim 1, wherein said structure for placing said liquid under tension comprises and acoustical wave source.

3 (Withdrawn) The reactor of claim 1, wherein said structure for placing said liquid under tension comprises an acoustical wave source.

4. (Withdrawn) The reactor of claim 2, wherein said acoustical wave source includes an acoustical wave focusing device.

5.(Withdrawn) The reactor of claim 1, wherein said structure for placing said liquid under tension comprises at least one centrifugal source.

6(Withdrawn) The reactor of claim 1, wherein said structure for placing said liquid under tension comprises at least one magnetrostrictive source.

7(Withdrawn) The reactor of claim 1, wherein said structure for placing said liquid under tension comprises at least one piezoelectric source.

8(Withdrawn) The reactor of claim 1, wherein said nucleated bubble radius is less than 100 nm.

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9 (Withdrawn) The reactor of claim 1, wherein a ratio of a maximum radius of said expanded bubbles divided by said nucleated bubble radius is at least 105.

10 (Withdrawn) The reactor of claim 1, wherein said nuclear source comprises at least one selected from the group consisting of alpha emitters, neutron sources and fission fragments.

11(Withdrawn) The reactor of claim 1, wherein said nuclear source comprises a neutron source.

12 (Withdrawn). The reactor of claim 11, wherein said neutron source is an isotopic source having at least one shutter, said shutter opened to synchronize neutron impact with location in said liquid when said liquid is at a predetermined liquid tension level.

13 (Withdrawn) The reactor of claim 1, wherein said nuclear source comprises an alpha particle source.

14 (Withdrawn) The reactor of claim 13, wherein said alpha particle source is dissolved in said liquid.

15 (Withdrawn) The reactor of claim 1, wherein said liquid comprises deuterated acetone.

16(Withdrawn) The reactor of claim 1, wherein said reactor further includes a controller for synchronizing delivery of at least one cavitation signal from said cavitation initiation source at a predetermined location in said liquid.

17(Withdrawn) The reactor of claim 1, further comprising a structure for cooling said liquid to a temperature below an ambient temperature.

18 (Withdrawn) The reactor of claim 1, wherein said fusion reaction generates at least one of tritium and neutrons.

19 (Withdrawn) The reactor of claim 1, further comprising at least one external constraint for restraining said liquid.

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20 (Withdrawn) A nuclear fusion-based electrical power plant, comprising: a) a reactor chamber for holding a working liquid; said working liquid molecules including at least two nuclei of heavy isotopes of hydrogen; b) structure for placing at least a portion of said working liquid into a tension state, said tension state being below a cavitation threshold of said liquid, said tension state imparting stored energy into said liquid portion; c) a nuclear cavitation initiation source for nucleation of at least one bubble from said tension liquid, said bubble having an as nucleated bubble radius being greater than a critical bubble radius of said liquid; d) a pressure field source for growing said as nucleated bubble to form at least one expanded bubble; e) a pressure field for imploding said expanded bubble, wherein following implosion of said bubble a resulting temperature sufficient to induce at least one nuclear fusion reaction is provided to said liquid, and f) structure for converting energy released from said fusion reaction to electrical energy.

21. (Withdrawn) A nuclear fusion-based projectile launcher, comprising: a) a reactor chamber for holding a working liquid molecules, said working liquid molecules including at least two nuclei of heavy isotopes of hydrogen; b) structure for placing at least a portion of said working liquid into a tension state, said tension state being below a cavitation threshold of said liquid, said tension state imparting stored energy into said liquid portion; c) a nuclear cavitation initiation source for nucleation of at least one bubble from said tensioned liquid, said bubbles having an as nucleated bubble radius being greater than a critical bubble radius of said liquid; said bubbles a resulting temperature sufficient to induce at least one nuclear fusion reaction is provided to said liquid, and d) a movable constraint bounding said reaction chamber for transferring energy from said fusion reaction to propel a projectile. e) a pressure field for imploding said expanded bubble, wherein following implosion of said bubble a resulting temperature sufficient to induce at least one nuclear fusion reaction is provided to said liquid, and f) a movable constraint bounding said reaction chamber for transferring energy from said fusion reaction to propel a projectile.

22. (Cancelled) A method for producing nuclear fusion, comprising the steps of: a) placing working liquid molecules into a tension state, said working liquid molecules including at least two nuclei of heavy isotopes of hydrogen, said tension state being below the cavitation threshold of said working liquid, said tension state imparting stored energy into said working liquid; b) cavitating at least a portion of said tensioned liquid with nuclear particles sufficient to bubble nucleate at least one bubble, said bubble

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having an as nucleated bubble radius greater than a critical bubble radius of said liquid; c) growing said as nucleated bubble to form at least one expanded bubble using a pressure field; and d) imploding said expanded bubble, wherein a resulting temperature from said implosion is sufficient to induce a nuclear fusion reaction involving said liquid.

23. (Cancelled). The method of claim 22, wherein said fusion reaction is a D-D reaction or a D-T reaction.

24. (Cancelled). The method of claim 22, further comprising the step of degassing said liquid.

25. (Cancelled). The method of claim 22, further comprising the step of cooling said liquid to a temperature below an ambient temperature.

26. (Withdrawn) The method of claim 22, wherein a centrifugal source is used for said tensioning.

27 (Cancelled). The method of claim 22, wherein an acoustical wave source is used for said tensioning.

28 (Cancelled). The method of claim 27, further comprising the step of focusing acoustical waves provided by said acoustical wave source.

29 (Cancelled). The method of claim 22, wherein said as nucleated bubble radius is less than 100 nm.

30 (Cancelled). The method of claim 22, wherein a ratio of a maximum radius of said expanded bubbles divided by said as nucleated bubble radius is at least 105.

31 (Cancelled). The method of claim 22, wherein a neutron source is used for generating neutrons, further comprising the step of synchronizing neutron impact with a location in said working liquid having a predetermined liquid tension level.

32 (Cancelled). The method of claim 22, further comprising the step of synchronizing delivery of at least one cavitation initiation signal with a desired tension level in said liquid.

33 (Cancelled). The method of claim 23, wherein said liquid comprises deuterated acetone.

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34. (Currently amended). A method for producing thermonuclear nuclear fusion, comprising the steps of: providing a working liquid enriched with molecules comprising isotopic D or T atoms ~~comprising molecules~~; placing at least a portion of said liquid into a tension state, a maximum tension in said tension state being below the cavitation threshold of said liquid, said tension state imparting stored mechanical energy into said liquid portion; directing fundamental particles ~~nucleating agents comprising at least one of: neutrons, photons, alpha particles and fission products~~, at said liquid portion when said liquid portion is in said tension state, said nucleating agents having sufficient energy for nucleating a plurality of bubbles substantially filled with vapor from said liquid, said bubbles substantially filled with vapor having an as nucleated bubble radius greater than a critical bubble radius of said liquid; growing said bubbles; and imploding said bubbles substantially filled with vapor, wherein a resulting temperature obtained from energy released from said implosion is sufficient to induce a nuclear fusion reaction of said isotopic D or T atom comprising molecules in said liquid portion.

35. (Previously presented). The method of claim 34, wherein said thermonuclear fusion reaction is a D-D reaction or a D-T reaction.

36. (Previously presented). The method of claim 34, further comprising the step of cooling said liquid to a temperature below an ambient temperature.

37. (Previously presented). The method of claim 34, wherein said tension state is a part of a time-varying pressure state including compressive and tensile portions.

38. (Previously presented). The method of claim 34, wherein said tension state is a constant tension state.

39. (Previously presented). The method of claim 34, wherein an acoustical wave source is used for said tensioning.

40. (Previously presented). The method of claim 39, further comprising the step of focusing acoustical waves provided by said acoustical wave source.

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41. (Previously presented). The method of claim 34, wherein said as nucleated bubble radius is from 10 to 100 nm.

42. (Previously presented). The method of claim 34, wherein a neutron source is used for said nucleating, further comprising the step of synchronizing neutron impact with a location in said liquid having a predetermined liquid tension level.

43. (Previously presented). The method of claim 34, wherein said liquid is an organic liquid.

44. (Previously presented). The method of claim 34, wherein said fundamental particles are selected from the group consisting of alpha particles, neutrons and fission fragments.

45. (Previously presented). The method of claim 34, wherein said growing and imploding occurs responsive to an applied acoustical field.

46. (Previously presented). The method of claim 34, wherein said liquid is a high accommodation coefficient liquid.

47. (currently amended) A method ~~An apparatus~~ for producing thermonuclear fusion, comprising the steps of : filling a chamber with ~~containing~~ a high accommodation coefficient liquid; ~~a means for~~ inducing tension in said high accommodation coefficient liquid; directing a nucleating agent comprising at least one of: neutrons, alpha particles, photons and fission products to said chamber; ~~a means for~~ enhancing the size of the nucleated bubbles in tension to a volume greater than a predetermined volume before inducing controlled implosion; thereby producing thermonuclear fusion.

48. (new) A method of claim 34, wherein the working liquid is de-gassed prior to being put in a tension state.

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